

REMARKS

Claims 1-13 and 15-19 are now in the application. By this Amendment, claim 1 has been amended. Support for the amendment to claim 1 is found at least at page 1, lines 28-29, at page 9, line 22, and at page 6, lines 1-2 of the specification. No new matter has been added.

Claims 1-13 and 15-19 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Eller et al. (WO 99/36459, as evidenced by US 6,362,312) in view of Funk et al. (US 6,036,845) and further in view of King (US 5,136,106).

Claim 1 recites, among other features, wherein the fluidization is carried out such that no significant amounts of catalyst are discharged from the polymerization reactor. At least this feature cannot reasonably be considered to be suggested by the applied citations.

At the reaction conditions defined in claim 1, the polymerization reaction of THF is a solution polymerization. One characteristic of this kind of polymerization reaction is that the developing polymer is dissolved in a solution, which is the monomer liquid phase. The polymer in monomer solution has a higher viscosity than the monomer solution without polymer. The viscosity depends on the concentration and the molecular weight of the polytetrahydrofuran emerging during the polymerization reaction. Therefore, the viscosity of the medium (i.e. the monomer and polymer containing solution) flowing through the fluidized catalyst bed is not constant, but increases with increasing polymerization. This has a large impact on the expansion of a fluidized catalyst bed. At constant flow rates of the medium the expansion of a fluidized catalyst bed depends directly on the viscosity of the medium. Higher viscosities lead to higher expansion of the catalyst bed to the point that the catalyst is discharged from the reactor together with the medium. Therefore, solution polymerizations in the related art have been carried out in fixed bed reactors.

The problem of changing viscosity does not arise for heterogeneous polymerization reactions if the monomer is in the gaseous state. In this case, the emerging polymer is deposited on the catalyst particles and is recovered by moving the catalyst particles from the reactor (e.g.

polymerization of polyethylene). The viscosity of the fluid (the gaseous monomer) does not change and the expansion factor of the catalyst bed remains nearly constant.

The claimed subject matter provides the parameters suitable for carrying out the solvent polymerization of THF in a fluidized catalyst bed, wherein the catalyst particles remain in the fluidized catalyst bed. The appropriate parameters are recited in claim 1 and further defined at page 7, lines 1-13, of Applicants' disclosure.

The parameters are maintained, by way of non-limiting example, by a suitably selected flow rate through the catalyst bed, as set forth on page 6, lines 2-7, by adjusting the recirculation, see page 10, lines 9-13, or by closed-loop control, as set forth in the example at page 13, lines 8-10, of Applicants' disclosure.

The claimed process is not obvious over US 6,362,312 (Eller et al), US 6,036,845 (Funk et al.) and US 5,136,106 (King).

Eller et al. suggests a solution polymerization of THF that takes place batchwise or in a fixed-bed reactor. As conceded in the Office Action, Eller et al. fails to suggest a fluidized bed reactor. Further, Funk et al. and King are not combinable in the manner suggested because they are not analogous art. Funk et al. suggests a gas phase oxidation of naphtha feedstock and King suggests a method of producing epoxides. A skilled artisan would not look to these citations for a suggestion of modifying the solution polymerization as taught in Eller et al.

Funk et al. suggests, at column 8, lines 52-56, the reaction of naphtha feedstock to aromatics, wherein both the starting materials and the products are vapors, i.e., in the gaseous state. Funk et al. fails to suggest a polymerization reaction, especially not a solution polymerization. The reaction is carried out in a fluidized catalyst bed with transportation of the catalyst particles along with the fluidized catalyst and regular discharge of the catalyst particles (see column 7, lines 32-36, column 8, lines 52-56, and column 9, lines 16-28). The catalyst is circulated together with the feedstock. See also claim 1, step b). The superficial velocity is given for the vapor mixture and the catalyst (column 8, lines 42-47). This process is distinct from the

process according to the claimed subject matter wherein the fluidization is carried out such that no significant amounts of catalyst are discharged from the polymerization reactor.

King suggests the heterogeneous alkoxylation of compounds containing active hydrogen in batch processes, in continuous fixed-bed processes, and in continuous fluidized-bed reactor processes. In example 15 the preparation of polyethylene glycol is eluded to, wherein the catalyst is placed in a reactor tube of a recirculating loop reactor. It is not described whether the reactor was used in a fixed-bed or in fluidized-bed mode, and if it was used in fluidized-bed mode, which expansion parameters were used. Also the meaning of "recirculating loop" reactor is not clear. It could refer to that only the fluid is recirculated, or the fluid and the catalyst, or only the catalyst. King fails to provide direction to a skilled artisan to arrive at the above-quoted features of claim 1. In addition, King suggests that the method of generating epoxides can be conducted in a fixed-bed reactor or a fluidized reactor. However, King does not suggest that any specific advantages are achieved by using the fluidized bed.

Therefore, Eller et al, Funk et al., and King, alone or in any permissible combination, provide no motivation or rationale to a person skilled in the art to derive a process in which the fluidization is carried out such that no significant amounts of catalyst are discharged from the polymerization reactor.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

If the Examiner believes that personal communication may expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Applicants concurrently herewith submit the requisite fee for a Request for Continued Examination in the amount of \$810 and for a Petition for a two-month Extension of Time in the amount of \$460. Applicants believe no additional fee is due with this response. However, if any additional fee is due, please charge our Deposit Account No. 22-0185, under Order No. 13156-00013-US from which the undersigned is authorized to draw.

Dated: November 26, 2008

Respectfully submitted,

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